Reg. No. : | | | | | | | | | | |

Question Paper Code: 46301

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Sixth Semester

Electrical and Electronics Engineering

14UEE601 - ELECTRIC DRIVES AND CONTROL

(Regulation 2014)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The basic elements of a electric drive are

   (a) electric motor (b) control system
   (c) electrical motor and control system (d) Transformer

2. Which of the following motor is preferred for blowers?

   (a) Wound rotor induction motor (b) Squirrel cage induction motor
   (c) DC shunt motor (d) DC series motor

3. A four quadrant operation requires

   (a) Two full converters in series
   (b) Two full converters connected in parallel
   (c) Two full converters connected in back to back
   (d) Two semi converters connected in back to back

4. In dc choppers, id Ton is on-period and f is the chopping frequency, then output voltage in terms of the input voltage Vs is given by

   (a) $V_s.T_{on} / f$ (b) $V_s.f / T_{on}$ (c) $V_s / f.T_{on}$ (d) $V_s.f.T_{on}$

5. Stator voltage control for speed control of induction motors is suitable for

   (a) fan and pump drives (b) drive of a crane
   (c) running it as generator (d) Constant load drive

6. In motor circuit static frequency changers are used for

(a) power factor improvement (b) improved cooling
(c) reversal of direction (d) speed regulation

7. The concept of V/f control of inverters driving induction motors results in

(a) constant torque operation (b) speed reversal
(c) reduced magnetic loss (d) harmonic elimination

8. The advantage of a synchronous motor in addition to its constant speed is

(a) better efficiency (b) high power factor
(c) lower cost (d) Less Noise

9. The Phase controlled rectifier always consumes

(a) Reactive Power (b) Real Power
(c) Apparent Power (d) Complex speed

10. The armature voltage control is only applicable for

(a) Above Base Speed (b) Below Base Speed
(c) both (a) and (b) (d) Critical speed

PART - B (5 x 2 = 10 Marks)

11. State the condition for steady state stability of motor load system.

12. Why does the armature voltage control is not preferred for the speeds above the rated value in dc motors?

13. Where is the V/f control used?

14. What is meant by margin angle of commutation?

15. Mention any four advantages of closed loop speed control.

PART - C (5 x 16 = 80 Marks)

16. (a) (i) Explain the concept and derive the mathematical condition for steady state stability of equilibrium point. (16)

Or

(b) Explain different types of electric braking in detail (16)

17. (a) Explain the operation of a three phase fully controlled rectifier control of dc separately excited motor. (16)

Or

(b) Explain the operation of a Type-A chopper fed drive and a Type-B chopper fed drive. (16)

18. (a) Explain the stator voltage control of induction motor with necessary diagram. (16)

Or

(b) (i) A 3-phase 60 *KW*,4000 *rpm*,460 *V*, 60 *Hz*, 2 pole star connected induction motor has the following parameter : R_s=0, R_r=0.28 Ω, X_s=0.23 Ω and X_m=11 Ω The motor is controlled by varying the supply frequency. If the breakdown torque requirement is 70 *Nm*. Calculate (a) the supply frequency and (b) the speed ω_m at the maximum torque. (8)

(ii) Explain the block diagram of vector control of induction motor drive. (8)

19. (a) (i) Explain the concept of open loop V\F control of synchronous motor. (8)

(ii) Explain power factor control of synchronous motor drive. (8)

Or

(b) Explain self-control technique of synchronous motor with constant margin angle control. (16)

20. (a) Derive the expression for transfer function of armature controlled DC servomotor. (16)

Or

(b) Explain the armature voltage control with field weakening mode operation of separately excited dc motor drive. (16)